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Bureau of Laboratories

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Clinical Laboratories are PulseNet Heroes

Patricia Somsel, Dr.P.H.
Director, Division of Infectious Diseases

In late spring of 1999, the MDCH laboratory found some unexpected similarities in 21 Salmonella isolates received from clinical laboratories for typing. They were identified as *Salmonella enteria* serotype Infantis, an uncommon serotype in this state. They originated from multiple counties and the initial epidemiologic investigation suggested a small town or rural association. Pulsed field gel electrophoresis (PFGE) testing of isolates and evaluation by PulseNet, the standardized electrophoretic comparison of isolates across states, indicated the isolates were confined to Michigan. Epidemiologists from MDCH, acting on information from the laboratory, identified hatchling chicks and ducklings raised on a mid-Michigan farm as the source of the isolates. These hatchlings were sold seasonally and through chick days at feed stores. Identical isolates were recovered from the incubation operations at the farm. Biosanitation efforts and culling of the breeding flock eliminated *Salmonella* Infantis from the facility. Although there were several hospitalizations, no deaths were associated with this outbreak. Study of the isolates recovered from patients and sent to MDCH allowed recognition of the source, intervention and prevention of further cases.

Between October and December of 1998, nine isolates of *Listeria monocytogenes* from blood cultures submitted from laboratories across Michigan, were found to be related, based upon PFGE analysis in the state laboratory. Comparison of these patterns to others available on the PulseNet established that they matched a strain identified by CDC, later designated the outbreak strain, associated with hot dogs and deli meats. A voluntary recall was initiated of nine brands of the packaged product associated with a single manufacturer. Submission of the isolates recovered from clinical cultures provided the crucial evidence needed to halt the distribution of a contaminated product which had claimed at least four lives from August to December 1998.

The PulseNet system has provided the tool needed to rapidly compare isolates within and across states and to adjust our epidemiologic investigations appropriately. It is now possible to identify sources of contamination within weeks instead of months, a time frame which allows intervention to prevent further disease. The result is lowered morbidity, lessened potential mortality and lower health care costs.

Technologists at the clinical bench are the heroes of this ongoing story. Reporting listed agents and forwarding specific isolates to the state laboratory provides the raw data for the PulseNet system. This allows recognition of outbreaks against the background of sporadic incidence. This system operates only because of the continued commitment to submitting these organisms to MDCH:

-*Salmonella* spp.
-*Shigella* spp.
-*E.coli* 0157:H7
-*Mycobacterium tuberculosis*
-*Listeria monocytogenes*
-*Neisseria meningitidis* from sterile sites
-*Haemophilus influenzae* from sterile sites (HIB vaccine has nearly eliminated

invasive disease, but surveillance is needed to assess effectiveness)
-Vancomycin-intermediate or resistant *Staphylococcus aureus*

MDCH recognizes that best efforts at control and elimination of these infectious diseases is crippled without assistance from the clinical laboratories. Awareness of the importance forwarding isolates plays in the health of the community, the state and nation is easily lost in the crush of daily duties. Staffing problems, billing issues, computer nightmares and budget woes tend to obscure the big picture. MDCH would like to say thank-you to the technologists and clinical laboratories that continue to contribute to these investigations.

Newborn Laboratory Changes Galactosemia Screening

Marilyn Boucher
Newborn Screening

The newborn screening laboratory recently changed its screening method for galactosemia, a condition wherein a newborn lacks one or more enzymes necessary to the body's breakdown and utilization of lactose or milk sugar. This hereditary autosomal disorder can cause seizures, cataracts, mental retardation, and can be swiftly fatal.

Previously, the laboratory measured total galactose, the actual sugar which accumulates in the blood. This method was the only quantitative technology available. An affected infant, given adequate lactose feeding, would show a highly elevated test result. However, many babies are now discharged from the hospital before they have had sufficient lactose feeding. Some babies are tested within hours of birth. Some are given only soy feeding in the nursery. The newborn screen for such infants may yield a false negative result.

Recently technology was developed by P.E. Wallac to quantitatively measure the actual enzyme missing in galactosemic infants. The Galactose-1-phosphate uridyl transferase or GALT test uses enhanced fluorescence to quantify the enzyme and is independent of the feeding status of the baby. This test allows the laboratory to more efficiently screen Michigan newborns for this serious disease.

In Memoriam
Linda Reese

On December 25, 2000, the Michigan Department of Community Health lost a valued friend and scientist, Linda Reese. Mrs. Reese worked for the Public Health laboratories for 28 years, first in developmental bacteriology and then in the microbiology section.

Mrs. Reese was responsible for typing the isolates of *Salmonella* spp., *Shigella* spp. and *E. coli* which were submitted to the MDCH laboratories. She was also responsible for performed testing for toxic shock. She also performed many other testing procedures over her career including fungal serologies, enteric organism identification and *Neisseria* spp. identification. Students who rotated through the microbiology section were usually reluctant to spend a day or two learning about serotyping but, without fail, came away from those sessions amazed that one person could clearly differentiate over 2000 serotypes of *Salmonella* spp. and that if approached logically, it was not that difficult. These trained individuals are now working throughout the public health laboratory system in the United States and abroad. She is credited with identification of the first *Salmonella* Lansing.

"Linda Reese was an outstanding microbiologist, but more importantly she was an outstanding person," said Dr. David R. Johnson, Michigan Department of Community Health chief medical executive. "Through her work in the laboratory, she looked to science to answer questions that had eluded others. Now we must do the same, as we struggle with the loss of a very dear friend."

Reese committed herself not only to her profession but also the community. She volunteered in many capacities, including her church, through HOSTS
(Help One Student to Succeed) mentoring program and was a former Girl Scout troop leader. She also recently made arrangements to keep four children at her house so they would not be living "on the streets". Linda is survived by her husband of 28 years (Michael) and two daughters (Amy, 20 and Rachel, 16).

Mercury Exposure and Testing

Cheryl Lariviere
Analytical Chemistry Section

Mercury is one of the primary pollutants of concern for Michigan. It has been identified as the third most important toxic substance on the Agency for Toxic Substances and Disease Registry (ATSDR) and U.S. Environmental Protection Agency (EPA) priority list of hazardous substances. This list currently contains a total of 275 substances. Acute (short-term) as well as chronic (long-term) exposure to metallic mercury can lead to serious health problems. Mercury occurs naturally in the environment in several forms.

Metallic or elemental mercury accounts for most human exposures. It is a shiny, silver-white odorless liquid used in thermometers and in other common consumer products such as fluorescent light bulbs, barometers, blood pressure measurement instruments and children's sneakers that light up. An area of particular concern, involves utility companies that may have had spills while removing and replacing outdated mercury regulators in homes. Children and many adults are often unaware of the hazards associated with mercury and find it fun to play with because of its elusive nature. Because metallic mercury vaporizes into the air at room temperature, it presents an immediate health risk. Very small amounts spilled on floors, carpet, clothing or furniture become difficult to clean up and can raise air concentrations to levels that may cause health problems.

Methylmercury may be taken into the body by eating certain saltwater and freshwater fish, particularly fish at the top of the food chain, such as shark, swordfish and large mouth bass. Other routes of exposures are through alkaline or button batteries, medical treatments, dental procedures, religious or herbal practices and mercury based paints.

Cycling of mercury in the environment is facilitated by the volatile character of the metallic form and by bacterial transformation of metallic and inorganic forms to stable alkyl mercury compounds. The absorption and metabolism of mercury is dependent on both its chemical and physical form. Inhaled as a vapor, elemental mercury is almost completely absorbed (about 80 percent) and diffuses rapidly across the placental and blood-brain barriers.

When ingested, elemental mercury is poorly absorbed from the gastrointestinal tract (about 0.01 percent). The surface of the metal becomes coated rapidly with endogenous sulfur-laden compounds, which impairs diffusion across the gastrointestinal mucosa. Effects of mercury toxicity manifest primarily in the central nervous system and kidneys, where mercury accumulates after exposure. Signs of mercury poisoning include headaches, insomnia, tremors, nausea, skin rashes and increased blood pressure.

To minimize exposure, one should avoid using metallic mercury. Appropriate substitutes are available for nearly all uses. In the event of an exposure to metallic mercury, for example a broken thermometer, ATSDR and EPA recommend that children first be removed from the area. Clean up the bead of metallic mercury by carefully rolling it onto a sheet of paper or sucking it up with an eye dropper. Never use a vacuum cleaner. Using a vacuum cleaner causes metallic mercury to vaporize, creating greater health risks. Avoid breathing mercury dust or vapors. Avoid contact with eyes, skin, and clothing. After picking up the metallic mercury, put it into a bag or airtight container. Wash hands thoroughly after handling. Ventilate the room to the outside and close it off from the rest of the home. The paper or eye dropper should be bagged with the spillage and disposed of properly. Do not simply throw it away, but instead seek professional guidance and follow-up instructions provided by environmental officials or your local health department.

Since 1988 MDCH has issued statewide Sport Fish Consumption Advisories targeted at mercury exposure. Analytical testing has been provided by the Bureau of Laboratories in conjunction with a Michigan Department of Environmental Quality (MDEQ) study for the collection and monitoring of fish from Michigan waters. At present the laboratory is able to provide urine analyses to measure mercury levels in the body. Since levels may vary greatly from day to day and even within a given day, creatinine level testing is performed on the same sample to obtain a correction value which is expressed as ug Hg/gram creatinine.

General information about mercury is available at 1-800-MITOXIC. Any questions concerning procedures for mercury testing can be directed to (517)

335-9490. To request a kit for mercury testing call (517) 335-9867.

Animal Rabies in Michigan –2000

Duane W. Newton, Ph.D.
Virology/Immunology Section

The 2000 rabies season was a banner year for testing at the MDCH laboratory. A record number of specimens (2983) were examined for the presence of rabies virus, with bats taking over as the primary species of animal tested. Table 1 is a summary of specimens tested over the past five years. It shows a steady increase in the number of specimens tested, as well as a transition from cats to bats as the primary specimen (as a percentage of the total tested). In 1997, the CDC first proposed a change in their recommendations as to what constitutes an exposure to a bat. In 1999 these recommendations were fully implemented and described a bat exposure as not only a bite or scratch from a bat, but also finding a live or dead bat in living quarters where it had access to sleeping persons, young children, mentally incapacitated or intoxicated individuals. The loosening of the definition of a bat exposure was initiated because of concerns that a bat bite might not be obvious to the victim, and that some persons would not be able to verbalize such an incident. The effect of the new criteria has been an increase over time in the number of bats submitted for testing. Although there has been a concomitant increase in the absolute number of rabies-positive bats, the rate of positivity
(Table 2) has remained relatively stable, the recent exception being 1999 where an increase in rabies-positive skunks was observed.

The year 2000 also marked an unusual incident in Michigan rabies history: the identification of rabid red foxes on Mackinac Island. At the end of October, a red fox that had been observed exhibiting signs of rabies (e.g., acting ill, drooling, difficulty maintaining balance) was found dead by the island park commission. The animal was submitted for rabies testing at the MDCH laboratory and found to be positive for rabies virus. About the time that the results of the first fox were made available, a second red fox was found dead on the island. This animal was also submitted for testing and was determined to be rabies-positive. Subsequent to these results being communicated throughout the island, reports of five additional sick foxes, that had died, were reported to the island park commission. None of these animals were available for testing. There were reports of other foxes that had been observed exhibiting a lack of fear of humans during the summer . Other individuals stated they noticed dead animal smells while hiking but were unable to locate any carcasses. It is not clear how the foxes acquired the virus. Rabies-positive foxes were reported in early in 2000 in Ontario, Canada north of Sault St. Marie. There has been speculation that infected foxes crossed Lake Huron from Ontario to the island while the lake was still frozen and spread the virus to the fox population on the island. Efforts are currently underway at both the MDCH and CDC rabies laboratories to determine the strain of rabies virus with which the Mackinac Island foxes were infected.

Table 1. Rabies specimens tested, by species

	Annual total (% of total)				
Species	1996*	1997	1998	1999	2000
Bat	278 (19.8)	473 (18.5)	481 (22.0)	808 (29.8)	1137 (38.1)
Cat	503 (35.9)	898 (35.2)	707 (32.3)	861 (31.8)	855 (28.7)
Dog	380 (27.1)	704 (27.6)	645 (29.5)	688 (25.4)	660 (22.1)
Other	242 (17.2)	476 (18.7)	357 (16.3)	352 (13.0)	331 (11.1)
Total	1403	2551	2190	2709	2983

*Partial year of data, Jun - Dec 1996

Any rabies related questions may be directed to Dr. Duane Newton, MDCH Bureau of Laboratories at (517) 335-8067, or Dr. Mary Grace Stobierski, MDCH Bureau of Epidemiology at (517) 335-8165.

Table 2 Rabies Specimens, Positive by Species

	1996	1997	1998	1999	2000

Bat	29	28	35	67	62
Skunk	2		2	21	2
Horse				3	1
Elk				1	
Fox					2
Cat					1
Total	13	28	37	92	68
% Positive of Total Tested	UNK *	1.1	1.7	3.4	2.2

*Denominator data incomplete

Quirky Bugs ...*Francisella tularensis*

Sandip Shah MS, MT (ASCP)
Reference Bacteriology

Recently, microbiologists in reference bacteriology saw a classic very tiny, pin-point gram negative coccobacillus on a Gram stain from a culture. At MDCH, the practice is to assume that this is a biosafety level III organism. Wearing personal protective equipment (PPE, gown, gloves and N-95 respirators), agglutination tests were performed and the organism was presumptively identified it as *Francisella tularensis*. In a matter of minutes, telephone reports were placed to the submitter, the county health department, MDCH Communicable Disease Epidemiology and Bureau of Laboratories directors.

Occasionally, exotic or rare bacterial isolates are received at MDCH, that pose an increased risk of laboratory acquired infection. Special handling and processing of these specimens is required to ensure a safe work environment. When working with highly infectious bacteria, PPE must be used and work must be performed in a Class II laminar flow biosafety cabinet. The submitting laboratory should include as much detailed patient information as possible on the MDCH test request form to facilitate safe confirmation of the isolate's identity.

This isolate of *F. tularensis* was submitted on a chocolate agar slant. Very little patient information was included on the MDCH test requisition, except the patient's sex and the specimen source. Initial Gram stain results revealed a very small gram negative coccobacillus measuring 0.2 by 0.7Fm. Blood (5% sheep), chocolate and MacConkey agar plates were incubated at 35^0C. A film-like growth was observed at 72 hours on the chocolate agar with growth developing four to five days later on the blood agar plate. No growth occurred on the MacConkey plate. The isolate did not agglutinate with *Brucella* antiserum, but did with antiserum to *F. tularensis*. The presumptive identification was confirmed by direct fluorescent antibody testing using *F. tularensis* specific antiserum. Additional testing at CDC provided a final identification of *F. tularensis* biovar *palaearctica* (type B).

Tularemia is a zoonosis associated with wild animals. In 1907, *Bacterium tularensis* was first described in humans as the causative agent of tularemia. In 1920, Edward Francis began what was to be life-long work dedicated to describing the clinical manifestations, diagnosis and histopathology of tularemia. In recognition of his work, the organism was renamed *Francisella tularensis* in 1974. It is a small, aerobic, non-motile, gram negative coccobacillus.

There are two different biovars of *F. tularensis*. Type A (biovar *tularensis*) is highly virulent for most mammals. The reservoir appears to be the cottontail rabbit and it is frequently transmitted by ticks. Type B *(*biovar *palaearctica)* is reported to cause epizootics in beavers, voles and muskrats. It is also considered to be

less virulent than Type A. Voles (*Microtus* spp.) are known to shed *F. tularensis palaearctica* into water due to bacteriuria thus maintaining tularemia contamination of water. Humans typically acquire the disease after contact with tissues or body fluids of infected animals or from bites of infected deer flies, mosquitoes or ticks. *F. tularensis* is considered a possible weapon of mass destruction and some countries are suspected to have weaponized it. Aerosolized *F. tularensis* causes pneumonic tularemia. Aminoglycosides (gentamicin or streptomycin) are the drugs of choice but doxycycline and chloramphenicol may also be effective.

The annual incidence of tularemia in the United States has declined concomitant with the decrease in hunting and trapping. There were a few hundred cases of tularemia in the United States in the 1990's. *F. tularensis* occurs worldwide, however, the global incidence is not available.

Direct Gram stain results may provide the best indication that this bacterium requires biosafety level III containment. In this case, the patient had expired and the tissue was collected for culture at the time of autopsy. Tularemia may be rare in Michigan, but it is a highly significant pathogen for the patient and the laboratory personnel involved in it's identification.

References:

1. CDC/APHL. Laboratory protocols for Bioterrorism Response Laboratories, 1999.

2. CDC/FDA. Biological Warfare and Terrorism, The Military and Public Health Response, 1999.

For more information visit http://www.cdc.gov

Laboratories Prepared for Bioterrorism?

James Rudrik, Ph.D.
Bureau of Laboratories

The ability of Michigan medical facilities to recognize and appropriately respond to the agents of bioterrorism (BT) was the purpose for a survey conducted by MDCH. The survey, distributed to 265 facilities between September and November 2000, was completed by 157 (59.2 percent) of the facilities. The survey asked about the ability of the microbiology staff to recognize BT agents and about the scope of services provided by the laboratory.

Forty five (28.7%) of the facilities indicated that they performed no on-site microbiology or provided services limited to screening cultures (e.g. Group A streptococcus, *Neisseria gonorrhoeae*). Results from the remaining 112 facilities provide a sample of microbiology laboratory capabilities throughout the state.

Less than half of all labs were familiar with the morphologic characteristics of selected BT agents. The

survey showed that 47.3%, 37.5%, 37.5%, 44.6%, 36.6% and 37.5% of labs would recognize *Bacillus anthracis, Brucella melitensis, Francisella tualrensis, Yersinia pestis, Burkholderia mallei,* and *B. pseudomallei*, respectively. Rapid tests like an India ink wet mount, Wayson stain, motility test and oxidase test that could be used to presumptively identify these organisms were routinely performed by 44.6%, 1.8%, 42.9%, and 87.5% of the labs, respectively. Fifty nine (52.7%) of the laboratories indicated that they routinely performed antimicrobial disk susceptibility testing or maintained the ability for specific organisms.

Eighty eight (78.6%) laboratories indicated a willingness to participate in the Laboratory Response Network for Bioterrorism (LRN). The LRN is a cooperative effort between the private sector and public health laboratories. The purpose of the network is not only to rapidly identify BT agents, but also to improve surveillance activities for BT agents, emerging pathogens and routine organisms by improving the lines of communication between public health and private laboratories. While the majority of labs (96.4%) were familiar with the list of agents that must be reported to public health authorities, only 58.9% of facilities appropriately indicated that they would notify their local health department and/or MDCH in the event of a biological emergency.

To improve communications between the Bureau of Laboratories and the laboratories, the survey asked each facility to identify a contact person. The name, address, telephone and fax numbers provided will be used to disseminate additional information about bioterrorism, educational opportunities, and provide a mechanism for rapid dissemination of information to the clinical microbiology community. MDCH will offer participating facilities ongoing in-service education on the recognition and identification of BT agents. A broadcast fax network to provide critical information about clinical microbiology and public health issues is planned for Spring 2001.

The survey briefly addressed laboratory safety and the shipping of infectious substances. Most laboratories (68.8%) have a Class II biological safety cabinet and have implemented engineering controls to prevent the production of infectious aerosols (75.9%). These safety measures are particularly important for *Brucella* species and *F. tularensis*. Aerosols of these agents are highly infectious and are frequently reported as the cause of laboratory-acquired infections. Most laboratories (70.5%) were aware of the federal regulations for the packaging and shipping of infectious material. The U.S. Department of Transportation requires that personnel involved in the shipping and transportation of dangerous goods receive training and certification every 36 months. Failure to comply with federal regulations can result in a civil penalty of up to $25,000 and criminal prosecution.

Any questions pertaining to this survey or the LRN may be directed to (517) 335-8183.

MDCH Laboratory Services Guide Now on WEB

www.mdch.state.mi.us/pha/bofl/labguide

The Michigan Department of Community Health, Bureau of Laboratories *Guide to Laboratory Services* is now on the department's WEB page in an updated, downloadable format. The *Guide to Laboratory Services* is intended to be a detailed, current, reference for those persons in your institution who are responsible for the collection and submission of specimens, whenever there are any questions regarding our testing procedures or specimen submission.

The quality assurance section will no longer send out hard copy updates. The WEB page will list the most current version of test's offered, forms necessary and staff contacts in the laboratories. Users are requested to verify and download current information for tests they routinely request to keep their hard copy manuals current.

Your input can only make the *Guide to Laboratory Services* a more useful tool for laboratories. If you have suggestions or comments contact Judith Kloss Smith - Quality Control Officer at smithjk@state.mi.us , phone (517) 335-8859 or fax (517)335-9631.

Outbreak of Poliomyelitis in the Dominican Republic and Haiti December 5, 2000

Since July 12, 2000, 19 persons with acute flaccid paralysis (AFP) have been identified in the Dominican Republic. These include six laboratory-confirmed cases with poliovirus type 1 isolates. All AFP cases were either unvaccinated or inadequately vaccinated. In Haiti, a single case of laboratory-confirmed poliovirus type 1 has been reported to date. The last reported case of AFP had a date of onset of November 18, 2000.

It appears that the outbreak virus is derived from oral polio vaccine (OPV) virus, has approximately 97% genetic identity to the parental strain, and appears to have recovered the neurovirulence and

transmissibility characteristics typical of wild poliovirus type 1. Nucleotide sequencing suggests that the virus has been circulating for about two years. The origin and continued circulation of these strains is in an area where routine vaccination coverage is low.

Since these cases have occurred in proximity to the United States and there is frequent travel between the United States and the Dominican Republic and Haiti, CDC is advising all state health departments to enhance their poliomyelitis surveillance, especially in communities with large immigrant populations from these countries.

The diagnosis of poliomyelitis should be considered in all patients who present with acute flaccid paralysis, especially those who have traveled to or have been exposed to persons who have traveled to the Dominican Republic or Haiti. If poliomyelitis is suspected, clinicians should promptly obtain stool samples, throat swabs, acute and convalescent serum samples, and cerebrospinal fluid samples for viral culture.

Questions regarding MDCH testing for poliomyelitis should be directed to Duane Newton, Ph. D. at (517) 335-8099.

NCCLS Interim Revision Still Effective for Chocolate Agar Quality Control

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Senior Laboratory Consultant
Hygienic Laboratory, University of Iowa

In July 2000, the National Committee for Clinical Laboratory Standards sent a memorandum to users of the NCCLS Infobase concerning the problems encountered with chocolate agar plates an and important revision of the relevant NCCLS standard, M22-A2: *Quality Assurance for Commercially Prepared Microbiological Culture Media–Second Edition; Approved Standard.*

The memorandum stated the following:"Because of a low failure rate in the past, chocolate agar was exempted from routine user testing in M22-A2, published in December 1996. However, at almost the same time , performance problems with chocolate agar plates from a major manufacturer were recognized. Based on review of available information, the Area Committee on Microbiology has recommended and the Board of Directors has approved an interim revision of the M22-A2 standard."

"While the area committee believes that the recent performance problems with chocolate agar represent an isolated occurrence, there is a complex, labile medium and that it is prudent for laboratories to perform routine quality assurance on receipt of the agar from the manufacturer."

The impact of this revision is that laboratories are still required to perform routine quality control testing on each new lot number or shipment of chocolate agar received from the manufacturer. Routine quality control testing for chocolate agar includes checking the sterility and ability to support growth of each new batch or shipment of plates.

(This article reprinted from Iowa's Environmental and Public Health Laboratory publication *Lab Hotline,* with permission of the author and the Iowa Department of Public Health.)

Upcoming Meetings

According to CLIA 88 (Section 493.1451 (b)(a)(7), the technical supervisor of a licensed laboratories must provide regular in-service training and education to persons performing tests. The training must be appropriate for the type and complexity of laboratory services performed. This training may be obtained not only at the place of employment but also at local, regional and national meetings. An abbreviated list of spring, 2001 meetings at which training may be obtained is shown below.

1. **Michigan Branch ASM**: The spring 2001 meeting will be held on March 24, 2001 at Wayne State University with a theme of "Vaccines for the New Millennium." For information, contact Dr. Judith Whittum-Hudson at jhudson@med.wayne.edu.

2. **South Central Association for Clinical Microbiology (SCACM)**: The spring 2001 meeting will be held in Indianapolis, Indiana on April 26-28, 2000. For information, contact SCACM at http://www.pages.prodigy.com/SCACM.

3. **Michigan Society for Clinical Laboratory Science (MSCLS)**: The spring 2001 meeting will be held at the Kellogg Center, East Lansing, MI on April 18-20, 2001. For information, contact MSCLS at http://www.mscls.org.

4. **American Society for Microbiology (ASM)**: The 101st General Meeting of the ASM will be held in Orlando, Florida on May 20-24, 2001. For information, contact the ASM at

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